

## WHAT IS CLAIMED IS:

1. An instrument panel (12) comprising:

a thermoplastic base substrate (54) having a first surface (56) and a second surface (58);

5 at least one tear seam notch (60) pressed into said first surface of said base substrate;

at least one consolidated area (66) pressed into said second surface of said base substrate, said at least one consolidated area aligned with said at least one tear seam notch;

10 at least one hinge area (74) comprising an area of low consolidation wherein a thickness of said base substrate at said low consolidation area is greater than a thickness of said base substrate at said at least one consolidation area, said at least one tear seam notch and said at least one hinge area defining at least one airbag door (78).

15 2. An instrument panel (12) in accordance with Claim 1 wherein a width of said at least one consolidated area (66) is equal to or greater than a width of said at least one tear seam notch (60).

3. An instrument panel (12) in accordance with Claim 1 wherein each said consolidation area (66) comprises a transition portion (72) located around the periphery of each said consolidation area.

20 4. An instrument panel (12) in accordance with Claim 3 wherein said transition portion (72) comprises a radius of curvature.

5. An instrument panel (12) in accordance with Claim 1 wherein said base substrate (54) is compression molded into a predetermined shape of said instrument panel.

25 6. An instrument panel (12) in accordance with Claim 1 further comprising an intermediate layer (82) adjacent said first surface (56) of said base substrate (54), said intermediate layer comprising a resilient material.

7. An instrument panel (12) in accordance with Claim 6 wherein said resilient material comprises a foam material.

8. An instrument panel (12) in accordance with Claim 6 further comprising an outer layer (84) adjacent said intermediate layer (82).

5 9. An instrument panel (12) in accordance with Claim 1 wherein a thickness of said base substrate (54) at said hinge low consolidation area (66) is greater than a thickness of said base substrate at an area adjacent said hinge area (74).

10 10. An instrument panel system (10) comprising an instrument panel (12) and an airbag (52), said air bag positioned adjacent said instrument panel, said instrument panel comprising:

10 a thermoplastic base substrate (54) having a first surface (56) and a second surface (58), said air bag positioned adjacent said second surface of said base substrate;

at least one tear seam notch (60) pressed into said first surface of said base substrate;

15 at least one consolidated area (66) pressed into said second surface of said base substrate, said at least one consolidated area aligned with said at least one tear seam notch;

20 at least one hinge area (74) comprising an area of low consolidation wherein a thickness of said base substrate at said low consolidation area is greater than a thickness of said base substrate at said at least one consolidation area, said at least one tear seam notch and said at least one hinge area defining at least one airbag door (78), said tear seam notch configured to open when said airbag deploys permitting said airbag to deploy through said instrument panel.

25 11. An instrument panel system (10) in accordance with Claim 10 wherein a width of said at least one consolidated area (66) is equal to or greater than a width of said at least one tear seam notch (60).

12. An instrument panel system (10) in accordance with Claim 10 wherein each said consolidation area (66) comprises a transition portion (72) located around the periphery of each said consolidation area.

30 13. An instrument panel system (10) in accordance with Claim 12 wherein said transition portion (72) comprises a radius of curvature.

14. An instrument panel system (10) in accordance with Claim 10 wherein said base substrate (54) is compression molded into a predetermined shape of said instrument panel (12).

5 15. An instrument panel system (10) in accordance with Claim 10 wherein said instrument panel (12) further comprises an intermediate layer (82) adjacent said first surface (56) of said base substrate (54), said intermediate layer comprising a resilient material.

10 16. An instrument panel (12) in accordance with Claim 15 wherein said instrument panel further comprises an outer layer (84) adjacent said intermediate layer (82), said at least one tear seam notch (60) is not visible through said outer layer before deployment of said airbag (52).

17. An instrument panel (12) comprising:

a thermoplastic base substrate (54) having a first surface (56) and a second surface (58);

15 an intermediate layer (82) adjacent said first surface of said base substrate, said intermediate layer comprising a resilient material;

an outer layer (84) adjacent said intermediate layer;

20 at least one airbag door (78) defined by at least one tear seam notch (60) pressed into said base substrate and at least one hinge area (74) comprising an area of low consolidation in said base substrate, said at least one airbag door not visible through said outer layer before an airbag (52) deployment causes said at least one airbag door to open.

25 18. An instrument panel (12) in accordance with Claim 17 wherein said at least one tear seam notch (60) is pressed into said first surface (56) of said base substrate (54).

19. An instrument panel (12) in accordance with Claim 17 further comprising at least one consolidated area (66) pressed into said second surface (58) of said base substrate (54), said at least one consolidated area aligned with said at least one tear seam notch (60).

20. An instrument panel (12) in accordance with Claim 19 wherein a thickness of said base substrate (54) at said hinge low consolidation area (74) is greater than a thickness of said base substrate at said at least one consolidation area (66).

5 21. An instrument panel (12) in accordance with Claim 19 wherein a thickness of said base substrate (54) at said hinge low consolidation area (74) is greater than a thickness of said base substrate at an area adjacent said hinge area.

10 22. A method of producing an instrument panel system (10) comprising an instrument panel (12) and an airbag (52), said method comprising press molding a thermoplastic base substrate (54) having a first surface (56) and a second surface (58) into a predetermined shape of the instrument panel, wherein press molding the base substrate comprises:

pressing at least one tear seam notch (60) into the base substrate;

15 pressing at least one consolidated area (66) into the second surface of the base substrate, the at least one consolidated area aligned with the at least one tear seam notch;

20 pressing at least one hinge area (74) into the second surface of the base substrate, each hinge area comprising an area of low consolidation wherein a thickness of the base substrate at the low consolidation area is greater than the thickness of the base substrate at a consolidation area, the at least one tear seam notch and the at least one hinge area defining at least one airbag door.

23. A method in accordance with Claim 22 wherein a width of the at least one consolidated area (66) is equal to or greater than a width of the at least one tear seam notch (60).

25 24. A method in accordance with Claim 22 wherein each consolidation area (66) comprises a transition portion (72) located around the periphery of the consolidation area.

30 25. A method in accordance with Claim 22 wherein a thickness of the base substrate (54) at the hinge low consolidation area (74) is greater than a thickness of the base substrate at the at least one consolidation area (66).

26. A method in accordance with Claim 22 further comprising forming an intermediate layer (82) adjacent the first surface (56) of the base substrate (54), the intermediate layer comprising a resilient material.

5 27. A method in accordance with Claim 26 further comprising forming an outer layer (84) adjacent the intermediate layer (82).

28. A method in accordance with Claim 26 further comprising positioning the airbag (52) adjacent the at least one airbag door (78).

10 29. A method in accordance with Claim 22 wherein pressing at least one tear seam notch (60) into the base substrate (54) comprises pressing at least one tear seam notch into the first surface (56) of the base substrate.

30. A method in accordance with Claim 22 wherein pressing at least one tear seam notch (60) into the base substrate (54) comprises pressing at least one tear seam notch into the second surface (58) of the base substrate.

15 31. A thermoplastic panel comprising at least one hidden airbag door (78), said panel further comprising:

a thermoplastic base substrate (54) having a first surface (56) and a second surface (58);

at least one tear seam notch (60) pressed into said base substrate;

20 at least one consolidated area (66) pressed into said second surface of said base substrate, said at least one consolidated area aligned with said at least one tear seam notch;

25 at least one hinge area (74) comprising an area of low consolidation wherein a thickness of said base substrate at said low consolidation area is greater than a thickness of said base substrate at said at least one consolidation area, said at least one tear seam notch and said at least one hinge area defining at least one airbag door (78).

32. A thermoplastic panel in accordance with Claim 31 wherein a width of said at least one consolidated area (66) is equal to or greater than a width of said at least one tear seam notch (60).

33. A thermoplastic panel in accordance with Claim 31 wherein at least one tear seam notch (60) is pressed into said first surface (56) of said base substrate (54).

5 34. A thermoplastic panel in accordance with Claim 31 wherein at least one tear seam notch (60) is pressed into said second surface (58) of said base substrate (54).

35. A thermoplastic panel in accordance with Claim 31 further comprising an intermediate layer (82) adjacent said first surface (56) of said base substrate (54), said intermediate layer comprising a resilient material.

10 36. A thermoplastic panel in accordance with Claim 35 further comprising an outer layer (84) adjacent said intermediate layer (82).

37. A thermoplastic panel in accordance with Claim 31 wherein a thickness of said base substrate (54) at said hinge low consolidation area (74) is greater than a thickness of said base substrate at an area adjacent said hinge area.